

CLAIMS:

What is claimed is:

1. A method of making antimicrobial fabrics comprising the steps of:  
creating a free radical species on a surface of the fabric;  
and  
reacting a polymerizable monomer with the free radical species to initiate graft polymerization of the monomer on the fabric surface, wherein the monomer has a functional group selected from antimicrobial groups, precursors to antimicrobial groups, and combinations thereof.
2. The method of claim 1, wherein the free radical species on the fabric surface is created by means of gamma irradiation polymerization techniques.
3. The method of claim 1, wherein the free radical species on the fabric surface is created by means of UV-assisted polymerization techniques.
4. The method of claim 1, wherein the free radical species on the fabric surface is created by means of flame-initiated polymerization techniques.
5. The method of claim 1, wherein the free radical species on the fabric surface is created by means of plasma-induced polymerization techniques.
6. A method of making antimicrobial fabrics comprising the steps of:  
treating a fabric with ozone to form peroxide groups on the fabric;  
decomposing the peroxide groups with an iron catalyst to form oxygen radicals;  
and  
grafting a polymerizable monomer to the oxygen radicals on the fabric surface.

7. The method of claim 6, wherein the monomer is carboxylic acid.
8. The method of claim 7, further comprising reacting the grafted monomer with a mineral acid and hydrogen peroxide to form a peracid on the fabric surface.
9. The method of claim 7, wherein the monomer is acrylic acid.
10. The method of claim 6, wherein the monomer is selected from the group consisting of quaternary ammonium salts, quaternary phosphonium salts, peracids, biguanides, iodophors, n-halamines and combinations thereof.
11. The method of claim 6, further comprising:  
regenerating the peracid by exposing the fabric to mineral acid and hydrogen peroxide.
12. The method of claim 6, wherein the fabric is selected from the group consisting of cotton, linen, gauze, polyester, nylon, acrylic and blends thereof.
13. The method of claim 6, wherein the monomer has a nonpolymerizable functional group selected from carboxyl, amino, hydroxyl, sulfhydryl, amido, and mixtures thereof.
14. The method of claim 6, further comprising:  
providing a polymerizable co-monomer along with the monomer to form a copolymer.
15. The method of claim 14, wherein the copolymers are selected from the group consisting of quaternary ammonium salts, quaternary phosphonium salts, peracids, biguanides, iodophors, n-halamines and combinations thereof.

16. The method of claim 14, wherein the copolymer contains a metal salt.
17. The method of claim 6, characterized in that the antimicrobial fabric has sufficient antimicrobial activity to kill microorganisms selected from the group consisting of gram-negative bacteria, gram-positive bacteria, mold, fungi and viruses.
18. The method of claim 17, wherein the gram-positive bacteria are *Staphylococcus aureus*.
19. The method of claim 17, wherein the gram-negative bacteria are selected from the group consisting of *Escherichia coli* and *Pseudomonas aeruginosa*.
20. The method of claim 6, wherein a disinfecting amount of the polymerizable monomer is grafted onto the fabric.
21. The method of claim 20, wherein the disinfecting amount of the polymerizable monomer grafted onto the fabric is sufficient to detoxify pesticides.
22. The method of claim 20, wherein the disinfecting amount of the polymerizable monomer grafted onto the fabric is sufficient to detoxify chemical and biological weapons.
23. An antimicrobial fabric produced in accordance with the method of claim 6.
24. The fabric of claim 23, wherein the fabric is formed into garments.
25. The garments of claim 24, wherein the garments are selected from the group consisting of masks, scrubs, lab coats, and caps.

26. The fabric of claim 23, wherein the fabric is formed into items selected from the group consisting of surgical drapes, bed sheets, bedding, privacy drapes, towelettes, hygiene wipes, dressings and bandages.
27. The fabric of claim 23, wherein the fabric has disinfectant properties.
28. The method of claim 6, wherein interfiber adhesion of the fabric is not disrupted.
29. The method of claim 6, wherein the method is carried out without substantial loss of fabric strength.
30. The method of claim 6, wherein the fabric retains tensile strength, tear resistance and abrasion resistance.
31. The method of claim 6, wherein the treating step is carried out at a temperature between about 40 and 80°C.
32. The method of claim 6, wherein the step of treating the fabric with ozone is carried out for between 10 minutes and 4 hours.
33. The method of claim 6, wherein the polymerizable monomer is supplied at a concentration of between 1 and 50 percent by weight.